RESOURCE MANAGEMENT STRATEGIES

Standard:

The IRWM plan must document the range of resource management strategies considered to meet the IRWM objectives and identify which resources management strategies were incorporated into the IRWM plan. The effects of climate change on the IRWM management area must factor into the consideration of resources management strategies. Resources management strategies to be considered must include but are not limited to:

Table 1 – Resource Management Strategies

Reduce Water Demand	**Improve Water Quality**
Agricultural Water Use Efficiency	Drinking Water Treatment and Distribution
Urban Water Use Efficiency	Groundwater / Aquifer Remediation
	Matching Water Quality to Use
Improve Operational Efficiency and Transfers	Pollution Prevention
Conveyance	Urban Runoff Management
System Reoperation	
Water Transfers	**Practice Resources Stewardship**
	Agricultural Lands Stewardship
Increase Water Supply	Economic Incentives (Loans, Grants, and Water Pricing)
Conjunctive Management & Groundwater Storage	Ecosystem Restoration
Desalination - Brackish and Seawater	Recharge Areas Protection
Precipitation Enhancement	Urban Land Use Management
Recycled Municipal Water	Water-Dependent Recreation
Surface Storage - CALFED	Watershed Management
Surface Storage - Regional/Local	
	Other Strategies
Improve Flood Management	*Other Strategies (includes crop idling for water transfers, dewvaporation, fog collection, irrigated land retirement, rainfed ag and transoceanic water bags) are coming soon.*
Modify Flooding	
Modify Impacts of Flooding	
Modify Susceptibility to Flooding	
Preserve and Restore Natural Resource	

Note: Resources Management Strategies shown in italics are being considered for California Water Plan 2009.

Guidance

Resource Management Strategies

The intent of the Resource Management Strategy standard is to encourage diversification of water management approaches as a way to mitigate for uncertain future circumstances and comply with § 75026 (a) of the public resource code.

A strategy as defined in the California Water Plan Update 2005 is a project, program, or policy that helps local agencies and governments manage their water and related resources. An example is urban water use efficiency as a strategy for reducing water use. A pricing policy or other incentive for customers to reduce water use is also a strategy.

The discussion in this section of guidance focuses on strategies as separate topics. In reality, the strategies are often connected to one another as well as to other activities such as land use planning. The operating assumption in this section is that to intentionally find ways to diversify a water management portfolio, considering differing strategies individually is helpful. Other IRWM Plan standards such as integration, address the relationships and synergies that can be gained by combining strategies.

In light of the water issues described in the Regional Description Section of your IRWM Plan and the IRWM Plan Objectives, the IRWM effort must consider strategies that will help achieve the plan objectives. Considering water management strategies should be done from the perspective of maximizing the diversity of strategies versus relying on a single strategy. Considering a strategy means reviewing a strategy and making a decision as to the applicability of the strategy in meeting the IRWM plan objectives. The review process and

decision process should be performed according to an IRWM's chosen governance. For each strategy considered, the Plan should document the reasoning behind the decision. This can be stated briefly, for example, if the IRWM region has no waters high in salt, Desalination as a strategy for increasing water supply is not applicable. From the IRWM plan perspective what is important is that the plan documents how strategies were considered (what process); what strategies were considered (at a minimum all those in the standard); and which strategies are viable for implementation. Whatever process is used (i.e. technical advisory input, stakeholder input, etc.) the value is in creating an intentional opportunity to diversify the water management portfolio. The Department's desire is to see IRWM efforts take advantage of the opportunity not simply run a process that arrives at a status quo strategy that has always been applied in the region.

IRWM efforts should note that in an IRWM Plan the Regional Description, Plan Objectives, and Governance Sections should support and be consistent with the decisions being made in the Water Strategies section.

The strategies listed in the standard (Table 1) are separated into seven categories. When considering strategies that will meet the objectives of your IRWM Plan, consider the categories: reduce water demand, improve operational efficiency and transfers, increase water supply, improve flood management, improve water quality, and practice resource stewardship. This may help an IRWM plan consider more than just the listed strategies as there may be additional strategies that are locally appropriate. Within each of these categories, the standard lists the specific strategies from the California Water Plan Update 2005. Each strategy contained in the standard is more fully explained in the California Water Plan Update, 2005, Volume 2:

http://www.waterplan.water.ca.gov/previous/cwpu2005/index.cfm#vol2.

The sections below contain a summary of what's in the water plan and additional information that may be helpful in understanding the water management strategies.

Insert text here on paying attention to CWP update 2009 addition of strategies and how that may affect IRWM plans.

Strategies that Reduce Water Demand

Water use efficiency whether agricultural or urban, addresses making the most of the water supply through appropriate application. Appropriate application in this context usually means understanding the minimum water requirement (quantity and quality) for a given task and delivering or applying the water in a manner that matches that requirement.

Agricultural water use efficiency typically involves improvements in technologies and management practices of agricultural supplies that result in water supply, water quality, and environmental benefits. Improvements in agricultural water use efficiency primarily occur from three activities:

- Hardware – improving on-farm irrigation systems and water supply delivery systems;
- Water management – improving the management of irrigation and water supply systems;
- Crop water consumptions – reducing non-beneficial evapotranspiration.

Urban water use efficiency involves technological and behavioral improvements in residential, commercial, industrial, and institutional water use that lower demand or lower per capita water use.

Strategies that Improve Operational Efficiency & Transfers

Conveyance refers to the infrastructure that moves water through whatever system exists in an IRWM region. Conveyance infrastructure includes natural watercourses as well as constructed facilities like canals, pipelines, pumping plants, diversion structures, distribution systems, and fish screens. Groundwater aquifers are also used to convey water. Improvements to conveyance can result in increasing water supply, protecting water quality, and increasing system operational flexibility.

System Reoperation means changing existing operations and management procedures for water facilities to meet multiple beneficial uses. Reoperation may improve the efficiency of existing uses or increase the emphasis of one use over another.

Water transfers can a temporary or permanent sale of a water right by a water right holder; a lease of the right to use water from the water right holder; or a sale or lease of a contractual right to water supply. Water transfers are sometimes seen as merely moving water from one beneficial use to another. However, in practice many water transfers become a form of flexible system reoperation linked to many other water management strategies.

Strategies that Increase Water Supply

Conjunctive management is the coordinated operation of surface water storage and use, groundwater storage and use, and conveyance facilities to meet the water management objective. The three primary components of conjunctive management to increase average water deliveries are recharge groundwater when surface water is available, switch to groundwater in dry years, and monitor to evaluate and respond to changes in groundwater, surface water, or environmental conditions.

Desalination is a water treatment process for the removal of salts from water, and is applied to waters of various salinities, ranging from brackish to sea water. In California the principal method for desalination is reverse osmosis.

Precipitation enhancement refers to the practice of artificially stimulating clouds to produce more precipitation than they would naturally. Commonly called cloud seeding, precipitation enhancement involves seeding clouds with silver iodide or liquefied propane to enhance droplet formation.

Recycled municipal water refers to treating of wastewater, storing, distributing, and using the recycled water. Californians have used recycled water since the late 1800s and public health protections have been in place since the 1900s. The use of recycled water has increased over the past several decades as water agencies seek to increase water supplies.

Surface storage – CALFED refers to the five potential surface storage reservoirs identified in the CALFED Record of Decisions. The five investigations are: Shasta Lake Water Resources Investigation, North-of-the-Delta Off-stream Storage, In-Delta Storage Project, Los Vaqueros Reservoir Expansion, and the Upper San Joaquin River Basin Storage Investigation.

Surface storage – Regional/local refers to the use of reservoirs to collect water for later release and use. Reservoirs can be formed by building dams across active streams or by building off-stream reservoirs where the majority of the water is diverted into storage from a nearby water source.

Strategies that Improve Flood Management – TO BE ADDED

Strategies that Improve Water Quality

Drinking water treatment and distribution refers to physical, biological, and chemical treatment of water to improve the quality for potable use and the conveyance of that treated water to end users. Equal access to drinking water is just one of the challenges in water management. Other challenges include maintaining water quality throughout a distribution system, matching water quality to use, and an ever emerging array of contaminants.

Groundwater remediation/Aquifer remediation refers to the removal of contaminants, natural or anthropogenic, from groundwater and the use of treated water for beneficial use. Often times, pump and treat systems are used for remediation. Once extracted from the ground, the water is treated, and then the water can be returned to the aquifer directly or diverted to some other use.

Matching water quality to water use is a strategy that relies on the principle that not all water uses require the same quality of water. With our ever increasing ability to reliably identify and detect compounds in water and our knowledge about what compounds and their concentrations are beneficial, necessary, or harmful in specific applications provides the opportunity to match water quality to water use. For example, water that we consider clean enough to drink, may be deficient in compounds beneficial to waters in a riparian eco-system; conversely, drinking water may contain too many compounds for water used in a research laboratory. With the use of a recycled water source, there is an opportunity to treat water to differing levels of quality and deliver that water to appropriate uses.

Pollution prevention can improve water quality for all beneficial uses by protecting water at its source. As pollution sources encroach on water sources, active steps may be necessary to preserve the existing quality of the water source. Restoring natural functions of watersheds can help preserve not only water quality but ecological function.

Urban runoff management is a series of activities to manage runoff for other beneficial uses. Urban runoff management is often linked to other strategies including pollution prevention, land use management, watershed management, and conjunctive management. One method of urban runoff management is low impact development (LID). LID seeks to reduce the amount of runoff generation at a developed site through design practices. Additional information on LID can be found at:

http://www.swrcb.ca.gov/lid/index.html

http://www.swrcb.ca.gov/funding/lid/projects.html

http://www.lowimpactdevelopment.org

http://www.epa.gov/nps/lid/

http://www.huduser.org/publications/destech/lowimpactDevl.html

Strategies that Practice Resource Stewardship

Agricultural lands stewardship refers to agricultural land as defined by the California Land Conservation Act. The goal of this approach is to promote sustainable agricultural practices with an economic return, while managing these productive lands for multiple benefits, including water management improvements.

Economic incentives (Loans, Grants, Water Pricing) refers to financial assistance and pricing policies intended to influence water management. Economic incentives can influence amount of use, time of use, wastewater volume, and source of supply.

Ecosystem restoration focuses on rehabilitating ecosystems so that they supply important elements of their original structure and function in a sustainable manner. As understanding of the linkage between water management and the health of the natural infrastructure grows, the benefits of restoration to water supply and water quality improvements are increasingly evident. While ecosystem restoration is apt to many situations, IRWM regions are encouraged to also consider and practice preservation. Resource stewardship should not be narrowly defined as only restoring what has been degraded. If there are areas within an IRWM region where healthy functioning ecosystems exist, it is often more economical and ethical to preserve the state of health and the benefits derived from a functioning ecosystem rather than allowing degradation to elicit a reactive management stance.

Floodplain management as discussed in the California Water Plan Update 2005, refers to reducing risks to life and property and providing benefits to natural resources by allowing floodplains to function in their flood relieving capacities attached to the water infrastructure rather than attempting to maintain rivers within their channels and off floodplains. Since the 2005 update, the evolution of IRWM plans, now points to including a much more robust flood management component in IRWM plans so that IRWM plans can function as regional flood management plans. IRWM plans are encouraged to not only consider floodplain management as a strategy but to further incorporate flood management throughout their IRWM Plans.

Recharge areas protection refers to protecting or preserving natural or man-made recharge areas so that the quantity and quality of groundwater in the aquifer is maintained. Existing and potential recharge areas should be protected so they remain functional and do not conduct contaminants into the groundwater.

Urban land use management refers to urban development patterns. The type of use and level of intensity has a direct relationship to water supply and quality. For example, although impervious surfaces make up a small percentage of most watersheds, the increase in runoff from these surfaces can result in larger amounts and more rapid runoff that can alter stream flow and watershed hydrology. As part of an urban land use management strategy, low impact development practices as mentioned previously, can provide ways to lessen the impact of development.

Water-dependent recreation is included among the water management strategies because recreation is an important consideration for water managers. Water management can have significant effects on recreation. Water-dependent recreation can be divided into two categories, one that occurs in water such as boating or fishing and one that is enhanced by water such as wildlife observation or hiking.

Watershed management is the process of evaluating, planning, managing, restoring, and organizing land and other resource use within an area of land that has a single common drainage point. Watershed management assumes that a prerequisite for any project is the sustained ability for the watershed to maintain the functions and processes that support the native ecology of the watershed. This implies an integration of human needs and ecological condition that allows the watershed to sustain ecological integrity over time while providing for sustainable community needs.